

CLAIMS

What is claimed is:

1. An insensitive high explosive molding powder in which explosive crystals are bound by a binder system comprising a bi-/tri-/tetramodal grain composition comprising coarse-grain and fine-grain explosive crystals bonded by a binder system coated in waterless solvent process having a solvent content of less than 0.01 wt. %.
2. The insensitive high explosive molding powder of Claim 1 wherein the coarse grain crystals have a mean grain size of 300-360 μm with an upper limit of 500-700 μm and the fine grain crystals follow harmonic rules of highest possible crystal grains packaging.
3. The insensitive high explosive molding powder of Claim 1 wherein the fine grain crystals from tri- and tetramodal distribution are substituted with up to 2 weight % fumed silica.
4. The insensitive high explosive molding powder of Claim 1 wherein the binder and plasticizer are present in a ratio of 1:0.8 to 1:3.
5. The insensitive high explosive molding powder of Claim 1 wherein the explosive crystals comprise RDX, HMX or a mixture thereof.
6. The insensitive high explosive molding powder of Claim 1 wherein the plasticizer is an acyclic dicarboxylic acid ester, or a phthalate.
7. The insensitive high explosive molding powder of Claim 6 wherein the plasticizer is an acyclic dicarboxylic acid ester selected from the group consisting of an ester of adipic acid and diisodecyladipate (DIDA).

8. The insensitive high explosive molding powder of Claim 7 wherein the ester of adipic acid is di(2-ethylhexyl)-adipate.
9. The insensitive high explosive molding powder of Claim 6 wherein the plasticizer is a phthalate selected from the group consisting of di-2-ethylhexylphthalate (DOP), di-isononylphthalate (DINP) and diisodecylphthalate (DIDP).
10. A pressed insensitive high explosive pellet comprising the insensitive high explosive molding powder of Claim 1.
11. The pressed insensitive high explosive pellet of Claim 10 having a diameter of about 2 to about 150 mm.
12. The pressed insensitive high explosive pellet of Claim 10 having a diameter of about 20 mm or about 100 mm.
13. A method of forming an insensitive explosive molding powder comprising:
- preparing a lacquer comprising one or more organic solvents, a binder and a plasticizer;
- adding the lacquer and an explosive component to a mixing kettle;
- heating the kettle to a temperature from about 35°C to about 40°C, while mixing at moderate agitation speeds; and
- removing the organic solvents by evacuation at a constant temperature of the ingredients of the kettle according to vaporization temperatures of the solvents, and at a rate that avoids boiling of the solvent.

14. The method of Claim 13 wherein the explosive component is RDX, HMX or a mixture thereof.
15. The method of Claim 13 wherein the plasticizer is an acyclic dicarboxylic acid ester, or a phthalate.
16. The method of Claim 15 wherein the plasticizer is an acyclic dicarboxylic acid ester selected from the group consisting of an ester of adipic acid and diisodecyladipate (DIDA).
17. The method of Claim 16 wherein the ester of adipic acid is di(2-ethylhexyl)-adipate.
18. The method of Claim 15 wherein the plasticizer is a phthalate selected from the group consisting of di-2-ethylhexylphthalate (DOP), di-isononylphthalate (DINP) and diisodecylphthalate (DIDP).
19. The method of Claim 13 further comprising a pressing step.